



6-Pin DIP Optoisolators for Power Supply Applications (No Base Connection)

The MOC8101, MOC8102, MOC8103, MOC8104 and MOC8105 devices consist of a gallium arsenide LED optically coupled to a silicon phototransistor in a dual-in-line package.

- Closely Matched Current Transfer Ratio (CTR) Minimizes Unit-to-Unit Variation
- Narrow (CTR) Windows that translate to a Narrow and Predictable Open Loop Gain Window
- Very Low Coupled Capacitance along with No Chip to Pin 6 Base Connection for Minimum Noise Susceptibility
- **To order devices that are tested and marked per VDE 0884 requirements, the suffix "V" must be included at end of part number. VDE 0884 is a test option.**

Applications

- Switchmode Power Supplies (Feedback Control)
- AC Line/Digital Logic Isolation
- Interfacing and coupling systems of different potentials and impedances

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

| Rating | Symbol | Value | Unit |
|--------|--------|-------|------|
|--------|--------|-------|------|

INPUT LED

| | | | |
|--|--------------------|-------------|-------------|
| Forward Current — Continuous | I _F | 60 | mA |
| Forward Current — Peak (PW = 100 μs, 120 pps) | I _{F(pk)} | 1 | A |
| Reverse Voltage | V _R | 6 | Volts |
| LED Power Dissipation @ T _A = 25°C Derate above 25°C | P _D | 120 1.41 | mW mW/°C |

OUTPUT TRANSISTOR

| | | | |
|---|------------------|-------------|-------------|
| Collector–Emitter Voltage | V _{CEO} | 30 | Volts |
| Emitter–Collector Voltage | V _{ECO} | 7 | Volts |
| Collector Current — Continuous | I _C | 150 | mA |
| Detector Power Dissipation @ T _A = 25°C Derate above 25°C | P _D | 150 1.76 | mW mW/°C |

TOTAL DEVICE

| | | | |
|---|------------------|-------------|-------------|
| Input–Output Isolation Voltage ⁽¹⁾ (f = 60 Hz, t = 1 sec.) | V _{ISO} | 7500 | Vac(pk) |
| Total Device Power Dissipation @ T _A = 25°C Derate above 25°C | P _D | 250 2.94 | mW mW/°C |
| Ambient Operating Temperature Range ⁽²⁾ | T _A | –55 to +100 | °C |
| Storage Temperature Range ⁽²⁾ | T _{stg} | –55 to +150 | °C |
| Lead Soldering Temperature (1/16" from case, 10 sec. duration) | T _L | 260 | °C |

1. Input–Output Isolation Voltage, V_{ISO}, is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4 and 5 are common.
2. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions.

Preferred devices are Motorola recommended choices for future use and best overall value.

GlobalOptoisolator is a trademark of Motorola, Inc.

REV 1

MOC8101

[CTR = 50–80%]

MOC8102

[CTR = 73–117%]

MOC8103

[CTR = 108–173%]

MOC8104

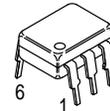
[CTR = 160–256%]

MOC8105*

[CTR = 65–133%]

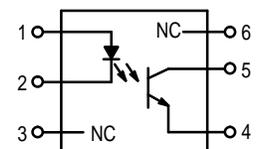
*Motorola Preferred Device

STYLE 3 PLASTIC



STANDARD THRU HOLE
CASE 730A-04

SCHEMATIC



- PIN 1. ANODE
2. CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. NO CONNECTION

MOC8101 MOC8102 MOC8103 MOC8104 MOC8105

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)⁽¹⁾

| Characteristic | Symbol | Min | Typ ⁽¹⁾ | Max | Unit |
|--|--------|-----|--------------------|-----|---------------|
| INPUT LED | | | | | |
| Forward Voltage ($I_F = 10\text{ mA}$) | V_F | 1.0 | 1.15 | 1.5 | V |
| Reverse Leakage Current ($V_R = 5.0\text{ V}$) | I_R | — | 0.05 | 10 | μA |
| Capacitance | C | — | 18 | — | pF |

OUTPUT TRANSISTOR

| | | | | | |
|--|---------------|-----|-----|----|---------------|
| Collector–Emitter Dark Current ($V_{CE} = 10\text{ V}$, $T_A = 25^\circ\text{C}$) | I_{CEO1} | — | 1.0 | 50 | nA |
| | I_{CEO2} | — | 1.0 | — | μA |
| Collector–Emitter Breakdown Voltage ($I_C = 1.0\text{ mA}$) | $V_{(BR)CEO}$ | 30 | 45 | — | V |
| Emitter–Collector Breakdown Voltage ($I_E = 100\ \mu\text{A}$) | $V_{(BR)ECO}$ | 7.0 | 7.8 | — | V |
| Collector–Emitter Capacitance ($f = 1.0\text{ MHz}$, $V_{CE} = 0$) | C_{CE} | — | 7.0 | — | pF |

COUPLED

| | | | | | | |
|---|---|----------------------------|--|--|--|---------------|
| Output Collector Current ($I_F = 10\text{ mA}$, $V_{CE} = 10\text{ V}$) | MOC8101 MOC8102 MOC8103 MOC8104 MOC8105 | I_C (CTR) ⁽²⁾ | 5.0 (50) 7.3 (73) 10.8 (108) 16 (160) 6.5 (65) | 6.5 (65) 9.0 (90) 14 (140) 20 (200) 10 (100) | 8.0 (80) 11.7 (117) 17.3 (173) 25.6 (256) 13.3 (133) | mA (%) |
| Collector–Emitter Saturation Voltage ($I_C = 500\ \mu\text{A}$, $I_F = 5.0\text{ mA}$) | | $V_{CE(sat)}$ | — | 0.15 | 0.4 | V |
| Turn–On Time ($I_C = 2.0\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\ \Omega$) ⁽³⁾ | | t_{on} | — | 7.5 | 20 | μs |
| Turn–Off Time ($I_C = 2.0\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\ \Omega$) ⁽³⁾ | | t_{off} | — | 5.7 | 20 | μs |
| Rise Time ($I_C = 2.0\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\ \Omega$) ⁽³⁾ | | t_r | — | 3.2 | — | μs |
| Fall Time ($I_C = 2.0\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\ \Omega$) ⁽³⁾ | | t_f | — | 4.7 | — | μs |
| Isolation Voltage ($f = 60\text{ Hz}$, $t = 1.0\text{ sec.}$) ⁽⁴⁾ | | V_{ISO} | 7500 | — | — | Vac(pk) |
| Isolation Resistance ($V_{I-O} = 500\text{ V}$) ⁽⁴⁾ | | R_{ISO} | 10^{11} | — | — | Ω |
| Isolation Capacitance ($V_{I-O} = 0$, $f = 1.0\text{ MHz}$) ⁽⁴⁾ | | C_{ISO} | — | 0.2 | — | pF |

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.
3. For test circuit setup and waveforms, refer to Figure 7.
4. For this test, Pins 1 and 2 are common, and Pins 4 and 5 are common.

TYPICAL CHARACTERISTICS

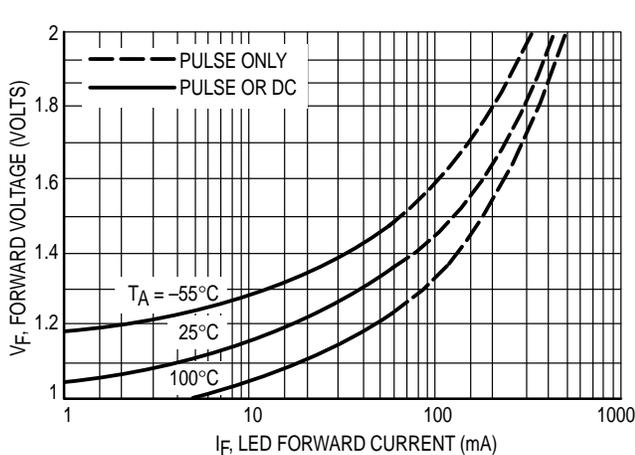


Figure 1. LED Forward Voltage versus Forward Current

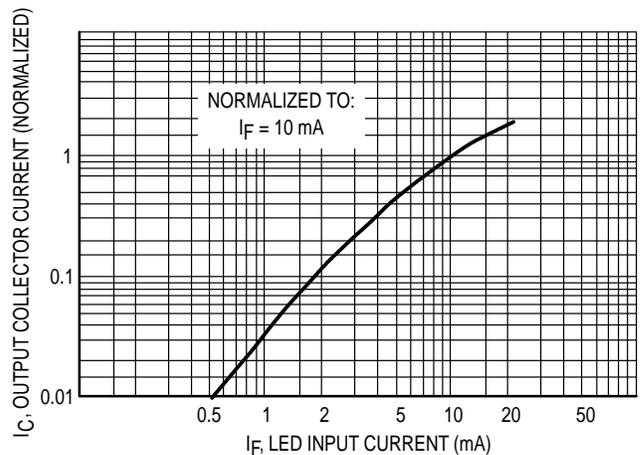


Figure 2. Output Current versus Input Current

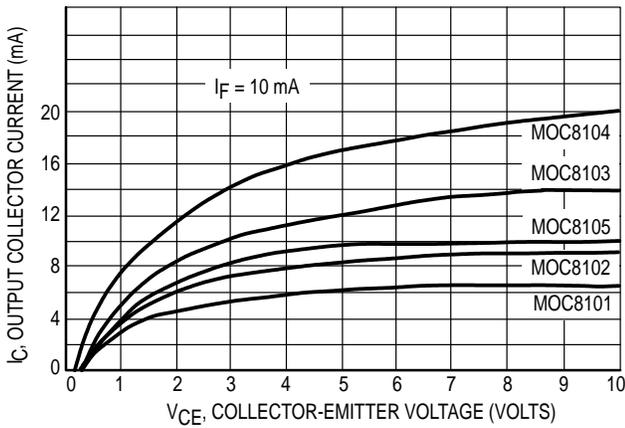


Figure 3. Collector Current versus Collector-Emitter Voltage

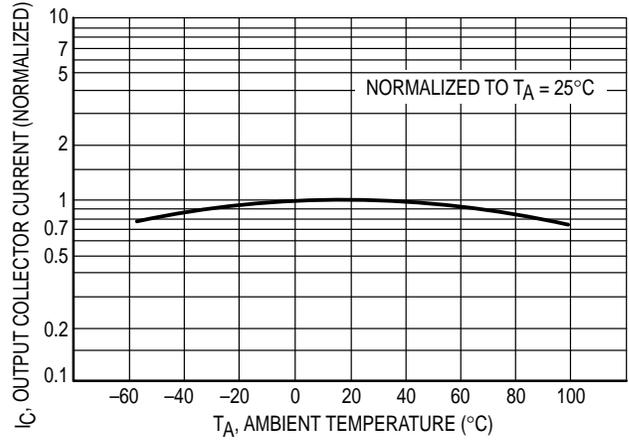


Figure 4. Output Current versus Ambient Temperature

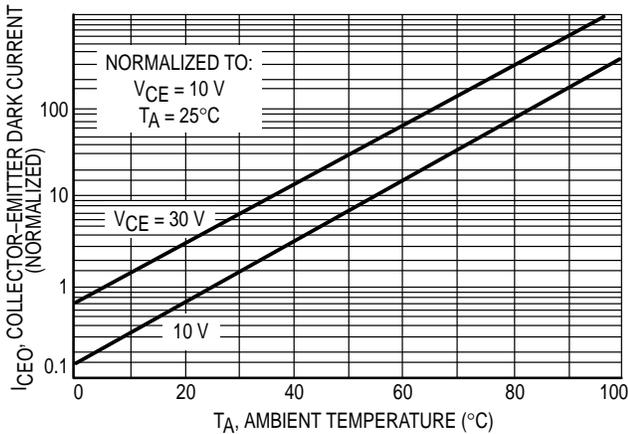


Figure 5. Dark Current versus Ambient Temperature

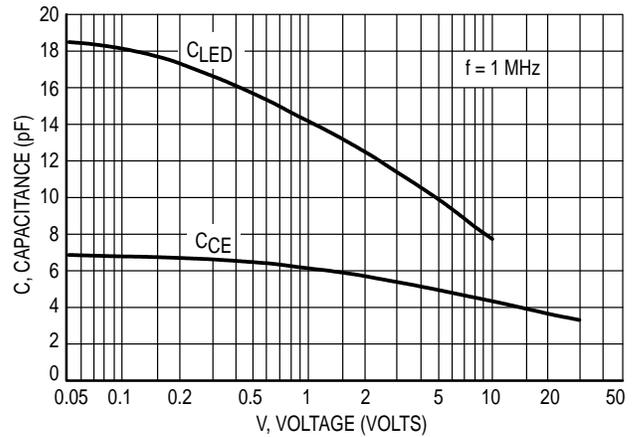


Figure 6. Capacitance versus Voltage

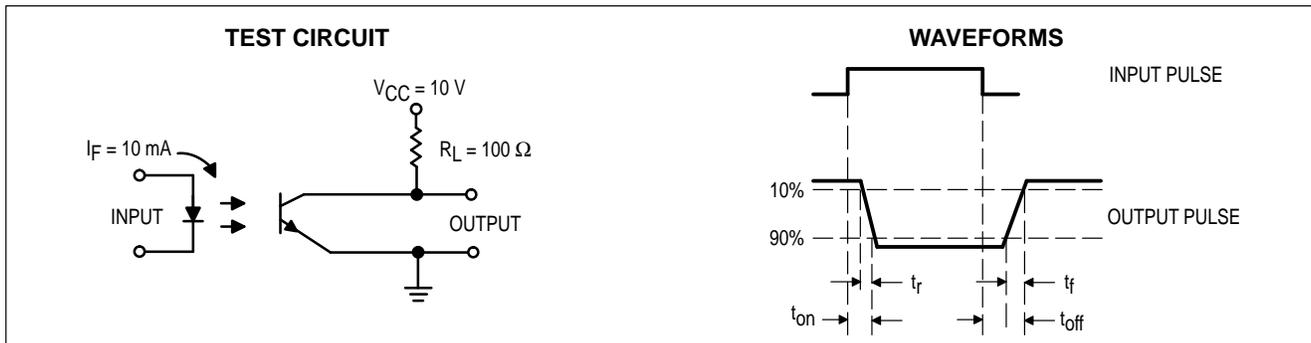
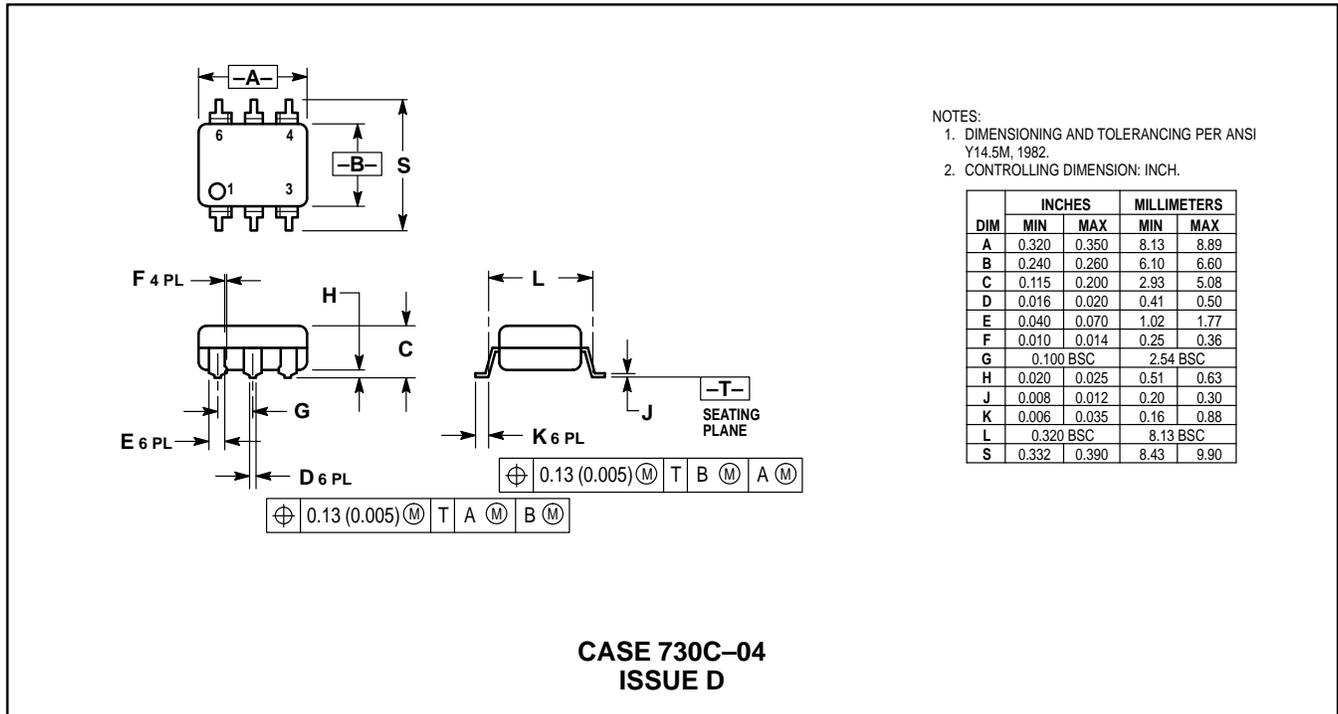
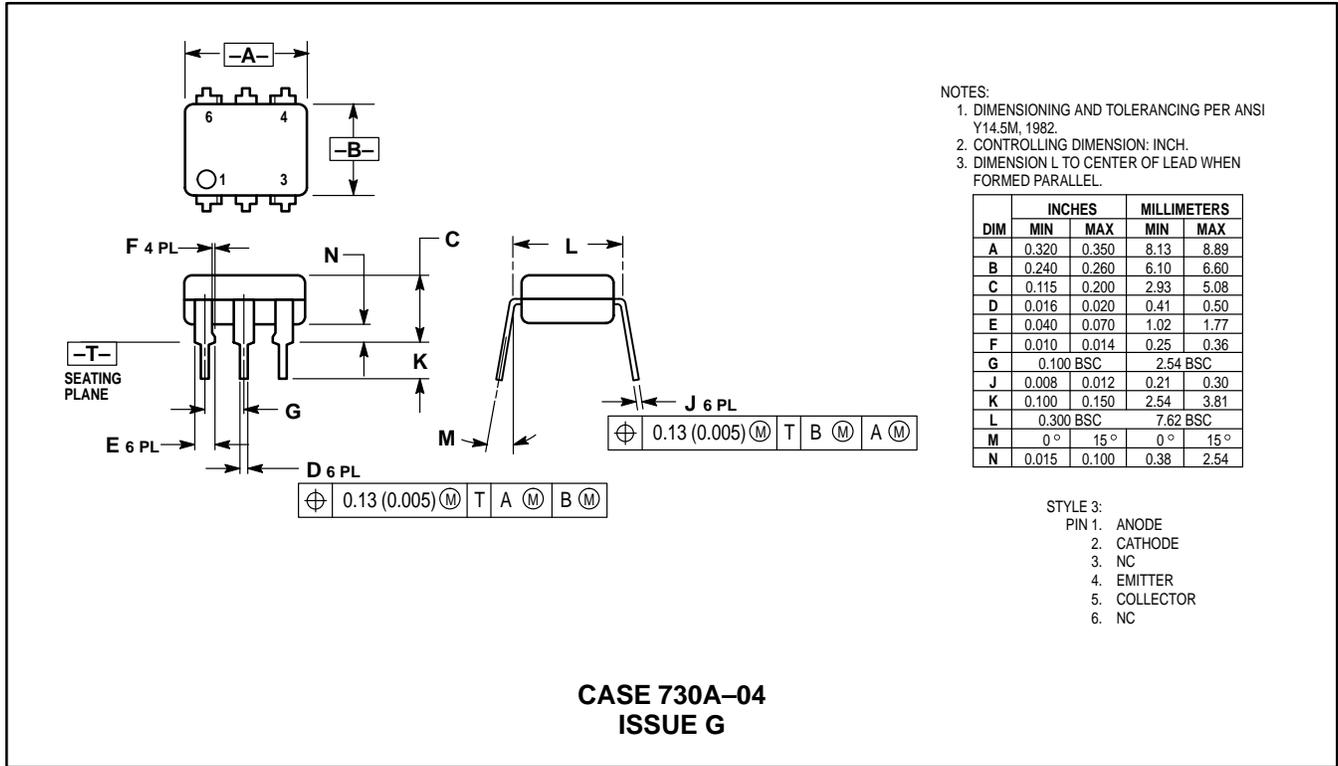


Figure 7. Switching Time Test Circuit and Waveforms

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MOC8101 MOC8102 MOC8103 MOC8104 MOC8105

PACKAGE DIMENSIONS



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